



Developing Innovative and Attractive CVET programmes in industrial shoe production

Task Analysis (TA) in Vocational Education and Training - Manual

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1 Task analysis (TA)

- an instrument for linking professional spheres of activity and learning in continuous vocational education and training (CVET)

1.1 Introduction

This handbook aims to provide guidance for the implementation of Task Analyses (TA) in industrial footwear production based on examples from different European countries. It has been prepared within the framework of the project "Development of innovative and attractive training programmes" (DIA-CVET). The aim of this project is to raise qualified personnel in industrial footwear production to the competence level of master craftsmen (or comparable, European Qualifications Framework (EQF) level 5-7) through attractive further training measures. To this aim, suitable programmes are to be developed that can enable or ensure this development of competences. In addition to the identification of essential spheres of activity of the foremen/master craftsmen, the so-called TA were identified as decisive instruments for the development and implementation of further training programmes.

Task analyses (TA) are an important instrument to determine the prerequisites for learning in the work process. Since continuing education measures are not ordered and defined by curricula to the same extent as initial vocational training, it is necessary to identify learning contents, learning modalities and learning environments as well as their design conducive to learning by means of suitable instruments and procedures, such as TA. The TA is oriented to actual (real) work processes by analysing the essential tasks at a certain level of competence and identifying their learning potentials.

However, this handbook does not provide a ready-made recipe for the implementation of TA, as the conditions and institutional developments of IVET as well as CVET are very specific in the different European countries. For example, the level of professional competences possessed by initial vocational education and training (IVET) graduates must be taken into account to ensure that continuing education and training measures can adequately link to these competences.

Likewise, it should be noted whether there are already certified further training programmes (CVET) for foremen (or comparable, EQF level 5, 6 or 7) in certain production areas, on which further training programmes for the industrial footwear sector can be based. In this context, analysing the possibilities of recognizing previous learning outcomes, whether through courses already completed or acquired informally, is absolutely part of developing new programmes. Moreover, industrial footwear production can and does differ to a greater or lesser extent in different countries in terms of production organization. Therefore, task analyses must be adapted to the respective job descriptions, division of labour and specific forms of work processes.

Thus, this manual only provides guidelines, benchmarks and basics for the implementation of TA. Adaptations to regional or national specifics are to be made by those who conduct task analyses in their countries.

It is advisable to avoid the concept of learning based exclusively on experience at this point. Since the use of TA focuses on the development of continuing education programmes that are assigned to a high EQF level, more theoretical content will also have to be included in the programmes.

Learning will therefore not take place exclusively in the work process (or at the workplace), but will be supplemented by theoretical (classroom) teaching units. However, these learning units are always complementary or theoretically in-depth to the work-integrated learning and thus also follow the structure and content of the current work processes.

To conclude these introductory remarks, the context of the emergence and development of TA should be briefly discussed: This manual is an adapted and shortened version of a Learning Station Analysis (LSA) manual, which was jointly developed by the Institute for Technology and Education (ITB) of the University of Bremen with trainers from Airbus Industries during the projects 'Move Pro Europe' and 'AERONET' in the field of aviation. This procedure has already been successfully re-used in the Leonardo project 'APPRENTSOD' and in the Erasmus+ project 'DualTRAIN' in other countries and industries. A first adaptation of the manual to industrial footwear production has already taken place through the Erasmus+ project ICSAS, but in this case the method was used exclusively for initial vocational training. In the present case, the modified method is applied for the first time to selected jobs with a high level of competence, i.e., a foreman or technician (EQF 5, 6 or 7) and in the context of the development of continuing education programmes. The procedure has been renamed task analysis (TA), but the workplaces in the company that offer learning potentials are still referred to as "learning stations".

2 TA – Objective and procedure

The task analysis is primarily aimed at uncovering the learning potential of exemplarily described jobs with increased occupational demands. Together with the analyses of other workplaces and the activities carried out there, it is intended to provide indications as to which further training measures can or should be implemented to achieve the competence profile of a foreman/master craftsman in industrial shoe manufacturing. The labelling as task analysis (TA) procedure thus already clarifies what it aims at.

"Learning stations" are created where essential work for the company and the company's work and business processes occurs. TA are therefore carried out at workplaces where the core tasks can be assigned to an occupational sphere of activity – although at a competence level that is to be located above skilled labour. These spheres of activity describe the required occupational activities on the basis of elementary work contexts and characteristic tasks that are typical for the occupational activity and comprise a complete work action. With this definition, spheres of activity can be delimited and specified as follows:

No individual activities are analysed, but tasks in the sense of a complete professional or technical action, which follow a structure defined in process and goal. A general process structure of a sphere of activity comprises the definition of the concrete task (e.g., the optimization of processes), of its planning (including the procurement of information) and execution as well as the control and evaluation of the work result up to the documentation. The concept of task analyses takes into account the following criteria:

- Task analyses must include the overall context of the professional work process.
- Task analyses must refer to the relevant spheres of activity.
- A Task analyses always describes a work context and a complete work action, emphasizing the connection between planning, executing and evaluating.
- The formulation of the documentation also includes the contents and forms of the specialized work.
- The analyses includes the meaning, function and significance of the specific work process in the context of the higher-level operational business process.
- Special attention is paid to the design potential that a foreman or technician can use.

The procedure of a TA is divided into four phases:

- Preparation of the analysis,
- Carrying out the analysis,
- evaluation and documentation of the analysis
- Use of the results for training programmes.

3 Task analysis - the approach

3.1 Preparation of the Task analysis

Although identified spheres of activity should be referenced for each TA, it is possible that no corresponding occupation or advancement qualification can be identified for certain work tasks. If this is the case, then the following practical approach is recommended: On the basis of the above-mentioned conditions that delimit spheres of activity from occupations, it is important to check whether a work process selected for analysis meets these requirements, because only then can learning stations contribute to competence development. However, it must also be taken into account that the competences aligned to spheres of activity cannot be fully developed in the learning stations, so that certain content (theoretical knowledge) must be acquired in the form of classical teaching.

Investigation Team

The preparation of a TA particularly includes the selection of the participants for the study. For reasons of an efficient, goal-oriented execution of a TA, a group of two persons is recommended, which should include an operational expert and a researcher or teacher. The following four functions are to be performed within the investigation:

1. conducting a conversation (interview);
2. preparation of a protocol (keywords);
3. preparation of photos and sketches;
4. organisation of working materials (e.g., drawings).

Choice of learning stations

If a sphere of activity, such as maintenance management, is assessed as relevant for a foreman or technician in industrial shoe production, it is necessary to select company workplaces as (possible) learning stations in a company or department, where qualified specialists can handle requirements that are representative for the sphere of activity. Company representatives in the investigation team are responsible for selecting the workplaces, as they have detailed insights into the business and work processes and can ensure the organizational prerequisites of the investigation >on site<.

As a rule, spheres of activity cannot be regarded as distinct from one another in practice. At many workplaces and thus also learning stations or task areas, work tasks of several spheres of activity are mastered, which are often closely linked to each other.

For the analysis, it is advisable to select workplaces or task areas with the "core characteristics" of a sphere of activity. Although the analysis only focuses on a single sphere of activity, the interfaces to other spheres must also be taken into account.

An overly broad simultaneous examination of several spheres can restrict the view of the essentials. If the organization of the technical work, e.g., in the case of findings (functional tests, disassembly, malfunction analysis), requires that several spheres of activity are involved at their core, it may be necessary to conduct several analyses, each from a different perspective.

One factor influencing the selection of jobs in departments and companies that should not be neglected is the willingness of the skilled employees working there to participate in an analysis of their work. Here it is particularly important to make it clear that we are not talking about analyses in preparation for rationalization measures, personnel restructuring or evaluations of individual performance.

3.2 Analysis guideline

Both for already established investigation teams and for those groups of people who are assembled for an analysis on a selective basis, it is important to deal with the analysis guideline for the investigation in detail beforehand:

- What qualifications do the specialists need for this sphere of activity?
- Is there a legal framework as a prerequisite?
- In which working environment is the work done?
- What tasks of qualified skilled work must be performed?
- What knowledge and skills are required?

Analysis category: Qualification for the task area

Many work processes of foremen, master craftsmen or technicians are linked to formal qualifications and/or verifiable work experience. These can vary greatly from country to country or even company to company. Furthermore, a distinction should be made in this category between mandatory and desirable qualifications.

Analysis category: legal framework

Particularly in the case of safety-relevant activities, it is not only experience or qualifications that matter; certificates not related to vocational training can also play a role. For example, when working in environmental or sustainability management, minimum requirements according to the corresponding ISO standard must be met.

Analysis category: Work environment

When describing the subject of the skilled work or the work environment, the work context and the work process are considered. For an industrial maintenance foreman/master craftsman, the object of work and the methods used differ from a maintenance foreman on the shop floor. Whilst the latter must determine the cause of the fault in the machine or production plant in the event of a malfunction and therefore requires detailed knowledge of the malfunction-free functional sequence in order to be able to determine the cause of the malfunction by comparing it with the faulty condition, the foreman/foreman for maintenance requires knowledge of prescribed maintenance and repair strategies.

Although at first glance maintenance is the target of the work, both the expertise and the method of skilled work differ significantly between the skilled work of maintenance at the workshop level and the skilled work of the foreman in industrial maintenance management.

Analysis category: Tasks of the specialized work

The foreman/maintenance supervisor must know and be able to improve the company maintenance plan. He must therefore know and implement various maintenance strategies. He must be able to analyse production processes and use this knowledge for maintenance. He must be able to analyse complete production processes and develop strategies for operational maintenance with this knowledge.

Analysis category: required knowledge and skills

What is identified here are the different requirements placed on the work process and the work object by the various interest groups. The company, for example, sets specific quality standards that result from competition and must be adhered to in skilled work, and demands compliance with time and cost specifications. Requirements on the part of legislators and regulators, e.g., in the form of technical standards and accident prevention regulations, must also be taken into account. Last but not least, the same applies to the foremen's own requirements for themselves and their work. It is only when these different and sometimes contradictory requirements are compared that the ability and the need to shape technology and skilled work become clear.

3.3 Carrying out the analysis and documentation

The professionals employed at the selected workplaces whose work is to be analysed are informed about what the Task analysis is about. It should be made clear to them that they should perform their everyday work: It is not about a "production" of unique craftsmanship or a demonstration of ideal practice, but about the professional's accomplishment of everyday work requirements. If there is no "highlight" as a work task on the analysis day, but rather unspectacular "routine work", this is not detrimental to the analysis, but reflects normality.

The workplaces are visited and examined according to the list. In the process, the foremen/masters are interviewed in order to also make the "invisible" visible. It is advisable to obtain consent for the recording of conversations, since the wealth of information is easier to master when evaluating on the basis of original recorded conversations and fewer mistakes, errors or misunderstandings are made that have to be corrected later.

The time required for the analysis depends heavily on the complexity of the tasks at the specific workplace. Experience shows that the time required is usually a few hours.

The documentation of a TA must be proofread and approved by employees of the respective department before further use.

4 Evaluation

The TA has two objectives: First, to compare the organization of work at the learning stations with spheres of activity, and second, to determine and evaluate the learning potential of these stations. The information given by the skilled workers interviewed at the workstations should provide the necessary clarity about this learning potential. However, the TA team should first consider what to expect when using the term "learning potential" in the context of continuing vocational education. "Potential" is certainly not a colloquial term like "learn." Potential expresses that something specific (e.g., a situation in everyday life or at work) offers opportunities or even good opportunities for something. So, in this case, potential is the (good) opportunity to learn. Unlike in colloquial language and in everyday life, "learning" in vocational pedagogy and in competence research does not simply mean providing a person with positive and, above all, effective support, but actually means increasing the level of professional competence (e.g., through competence enhancement) in the - here very narrow - sense that someone proactively learns to master something in the course of a learning process that he or she was not able to do previously.

In the DIA-CVET project, 13 spheres of activity have been identified for the professional profile of a foreman in industrial shoe production. Learning stations, whose learning potentials are revealed by the TA, are linked to each individual sphere of activity. With the latter, the possibilities and opportunities to learn in the process of work are addressed in particular, but not exclusively. Since not every workplace guarantees this to the desired extent, the results of the TA can also provide indications of how workplaces can be developed much more strongly in the direction of learning stations, which is synonymous with improving the learning opportunities.

For each learning station, core competences can be identified which, in the aggregation of all learning stations, represent core competences of an occupational profile foreman/master craftsman. When evaluating the TA, hierarchical dependencies between individual core competences as well as overlaps must be taken into account. For example, overlaps between the learning stations "Maintenance Management" and "Quality Management" are not only conceivable for the occupational profile of the foreman/master craftsman, but also probable.

The evaluation of TA must therefore be conducted under two central questions:

- What do you learn in one learning station and what of it is necessary for which other learning station?
- What competences do you need to have already to be able to learn something in any learning station?

In principle, these two questions must be answered in the analysis of each learning station. The most important two results of the analysis of a learning station are therefore firstly the specification of a prerequisite for learning and secondly the specification of a learning outcome, which itself becomes a condition for completing further learning stations.

A series of TA carried out comprehensively in a company results in a coherent sequence of the necessary learning steps determined by the operational processes. The evaluation should therefore be carried out from the point of view of the internal linking of all work processes, so that it can be checked whether the actual process nature of the work organization enables orientation to the spheres of activity, because according to the TA, this is where the requirements are located that individual learning must follow as a competence development process. With a view to the result of this evaluation step, it must then be examined whether the requirements characteristic for an individual spheres of activity - i.e., for the analysed learning stations - can also be acquired in the process of work or to what extent classical teaching must take place as a supplement.

5 Template

The documentation is naturally oriented towards the analysis categories. The template is semi-open, i.e., it can be adapted according to profession or context. In some cases, subcategories are pre-structured - of course always with the possibility to add free answers.

Sphere of activity Date Location		
Qualification for the sphere of activity		
Legal framework		
Working environment	Products	
	User	
	Interfaces internal	
	Interfaces external	
	Organization	
	Level of autonomy	
	Workplace	
Tasks		
Required knowledge and skills		

Tab. 1: Task analysis (TA) copy template

List of tables

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